**Department of Energy**
**National Nuclear Security Administration**
Washington, DC 20585

May 25, 2006

Mr. Matthew Moury
Directives Lead
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, D.C. 20004

Dear Mr. Moury

This letter transmits the responses to the Board's staff comments provided on May 17, 2006, regarding the Department of Energy Standard, DOE_STD-3016, Preparation Guide for U.S. Department of Energy Nuclear Explosive Operation Hazard Analysis Reports. These responses were also discussed with the Board staff on May 17, 2006.

If you have any questions or comments on these responses please call me at (202) 585-9056, or Mr. Kamiar Jamali at (301) 903-7167.

Sincerely

Frank B. Russo
Senior Advisor for
Environment, Safety and Health

Enclosure

**Response to DNFSB Staff Comments on DOE-NA-STD-3016-2006**
**Submitted to NNSA on 5/17/06**

| BOARD STAFF COMMENT NUMBER | RESPONSE |
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| 1. | Such details may be discussed in a Technical Business Practice (TBP) in the future if need be, but was judged as being below the level of detail that the authors considered appropriate for the HAR standard. There are always potential 'dangers' with any specific methods one might adopt in analyses. It is the responsibility of both the analysts and the reviewers to ensure that the specific methods they choose will not lead to oversights or omissions. The specifics of the HAR review and approval process are outside of the scope of this standard. Employing 'rules' or any other hazard analysis methods has no impact on estimation of accident scenario probabilities, or integration of these probabilities for various consequence categories. Also, the extent of the approach employed in this standard for propagation of uncertainties is that: (a) Degree of uncertainty in each probability estimate is reflected by deriving the mean of the associated lognormal distribution, as the central estimate parameter that increases in magnitude towards higher percentiles of the underlying distribution with increasing uncertainty, and (b) The mean is the only parameter that propagates through all stages of accident probability and even risk calculations (provided independence among the random variables – a condition that is nearly always satisfied in these applications). |
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| 2. | The basic premise of the standard articulated in Section 2, "Purpose," which states that the general requirements for HARs are those found in Chapters 2-5 of DOE-STD-3009. These requirements are more fully developed in this standard in order to account for issues unique to NEOs, and interface issues with SARs. Therefore, this standard does not expand on many areas that are covered in STD-3009. |
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| 3. | There is no need to make any special case out of common mode failures in the HAR hazard analysis requirements for several reasons:<br>• Common mode failures are of significance in probabilistic risk assessments (PRAs - and not in safety analysis regimes, as per commercial nuclear power precedent) for facilities and processes that employ complex safety systems that might have to interact in responding to accident conditions. This characteristic does not apply to the ***safety analysis*** regime associated with a HAR (nor does it apply to a reactor FSAR).<br>• Accounting for common mode failures in PRAs is through special techniques for calculation of their probabilities (i.e., probability of more than one failure of similar/identical components at the same |

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| | time or during the mission time). There are no special techniques that are offered through the consideration of common mode failures that uncover dependent failures that would otherwise remain "undiscovered."<br>• When and if such considerations (i.e., obtaining accurate probability estimates for dependent failure probabilities of similar components) are necessary in a HAR, they must be addressed as part of the HAR process in proper quantification of probabilities, as the requirement on completeness of HARs is explicitly invoked within the standard. ,<br>• The HAR standard is only complementing existing requirements in STD-3009 for application to nuclear explosive operations (NEOs). Consideration of potential for 'common mode failures' is not unique to NEOs.<br>It should be noted that the term "common mode" failures is only partially accurate, and was first introduced in WASH-1400. The more accurate terminology would be "common cause failures," as it is the potential for multiple failures of more than one safety function (i.e., violating redundancy or diversity in design) from a single cause (e.g., maintenance error) that is of concern, and not whether similar components fail in the same mode (e.g., failure to start). |
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| 4. | The authors performed a careful review of STD-3016-99 and D&P Chapter 11.8, and made a decision as to what parts of the two documents they wanted to preserve for the revised STD-3016.<br>• STD-3016 should not cover topics already covered by STD-3009, such as fire, severe worker injury, human reliability, damage to environment, etc.<br>• The HAR should contain the requisite information for NESSG deliberations (with the exception of the third standard, which is out of its scope), or it is deficient and does not meet the intended requirements.<br>• Discussion of treatment of uncertainties in "frequencies" (not frequencies but probabilities), large or small, is found in section 8.<br>• Requirement for annual review (not reviews but updates and associated reviews) is in 10CFR830.202(c).<br>A future TBP will address the logistics and mechanics of the processes that the DAs and the PPC will use in the HAR development process. |
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| 5. | Given that the standard is a small document, all terms are defined within the standard, and there is no need for a Definitions Section. |
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| 6. | The standard is clear in its discussion of the completeness of the HAR in Sections 3, 5, 6, 6.1, etc. The DA and the PPC decide whether a Weapon Safety Specification document is used as part of the |

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| | referenced and traceable analysis. All hazards must be covered irrespective of their source. There is no need for a 'defined method' to provide the weapon's internal hazards to the PPC. |
| 7. | The PPC and DAs are given the flexibility of using a screening table as they wish with a format that they can choose and modify as their needs evolve. They can capture these topics in a TBP in the future, if they so choose. Screening Tables were determined to be at a level of detail below what the standard should cover. |
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| 8. | Accept in part. "Should" was modified to "may" as it was realized that, in many instances, the employed process might simply be one of a peer review of an expert analysis that 'may' be gathered by some intermediary analyst and forwarded to other experts for peer review. A second use of a 'should' was modified to a 'shall.' |
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| 9. | The delicate balance between doing too much or too little, whether qualitatively, or quantitatively, is discussed repeatedly in both this standard and STD-3009. It would not be accurate to remove the wording on the secondary role that probability estimates serve in a safety basis document. In addition, NNSA generally does not expect any undue amount of effort to be expended in attempting to derive rigorous estimates of event probabilities, as in majority of cases; such efforts will have no impact on selection of adequate controls. |
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| 10. | The reason for not providing more specific guidance on expert elicitation is addressed in several places within the standard. These include:<br>• Mentioning any specific item (e.g., team leader qualifications) out of a possible list of many, would afford undue prominence to that item.<br>• Providing a comprehensive list of attributes of an expert elicitation process would give undue prominence to the entire process. This is because the final output from this process from the design agencies are a set of weapon response probabilities. But all probabilities must play only a secondary role in establishing the adequacy of controls, as qualitative analyses must be the centerpiece of the safety analysis process.<br>The standard gives maximum flexibility to the DAs for the development of their own expert elicitation processes, but all these processes will be subject to DOE review and approval. DOE review will decide whether the desired degree of consistency, formality, rigor, etc., is incorporated in these documents. |
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| 11. | Accept. Changed to "DA's." |
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| 12. | The standard provides the necessary level of detail. The mechanics of |

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| | the process may be covered in a TBP. |
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| 13. | The standard articulated in Section 2, "Purpose," which states that the general requirements for HARs are those found in Chapters 2-5 of DOE-STD-3009. These requirements are more fully developed in this standard in order to account for issues unique to NEOs, and interface issues with SARs. Therefore, this standard does not delve into many areas that are covered in STD-3009. STD-3009 covers all of these topics to in sufficient detail. There is nothing unique to HARs for any of these issues. There are solid reasons for the level of coverage these topics received in STD-3009. |
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| 14. | The intents of section 8 are:<br>• To force the use of point-estimates for individual event probabilities instead of bins,<br>• To ensure:<br>o Incorporation of uncertainties,<br>o Reflecting the degree of uncertainties in probability estimation process, and<br>o To make sure the overall process is consistent with the idea of being 'reasonably conservative.'<br>• BWXT participated in the final stages of the development and revision process, and is fully aware of what is expected of them.<br>• It is not desirable to have DAs only provide the means, because it is desired that the process, including the degree of uncertainties, to be more transparent to BWXT and PXSO.<br>• The DAs are providing more information to PPC than before, not less.<br>Based on discussion with DAs and BWXT, the authors believe that the standard is clear to its users in terms of its intents in section 8. |
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| 15. | Please see response to comment #10. In addition, now that the expert elicitation and peer review processes are required and must meet QA requirements, the DAs have the flexibility and the motivation to address the subject in a TBP to benefit the development of their organization-specific procedures. |
| 16. | The intended coverage includes emerging information. |